IAS Delta System/Preliminary Design Review

Agenda

• Introduction	J. Henegar
• System Architecture Overview	T. Ulrich
• Operations Concept	R. Whitman
• IAS Software Subsystem Design	
– Process Control Subsystem	J. Garrahan
– Data Management Subsystem	J. Garrahan
– Evaluation and Analysis Subsystem	D. Kaufmann
– Radiometric Processing Subsystem	J. Rowe
– Geometric Processing Subsystem	J. Storey
– End-to-End Scenario	J. Garrahan
• IAS Hardware Architecture	D. Slater
• Wrap-up	

Purpose of IAS

- Primary IAS Tasks
  - Assess quality of L0R Products
  - Calibrate instrument and spacecraft
  - Support anomaly investigation

- The execution of these tasks determine the data to be acquired and processed

IAS Delta System/Preliminary Design Review

IAS Assessment Table

Scene Type	# to order/ quarter	# to Process /Level	Assessments and Calibrations	Outputs/Reports
Random Day Scene	90	90 /1Gs	Level 0R Product Quality (Table 3.2.2.4-1) Detector Operability Detector Saturation Impulse and Random Noise Banding and Striping	Daily Assessment Report
Geodetic Test Site	6-24	(1) 12-48/1Gs	Geodetic Accuracy Sensor Alignment	Calibration Reports for each Quarterly Report/CPF Update
Geometric Super-Site	2-6	(2) 4-12/1Gt	Scan Mirror Calibration I-I Registration Assessment	Calibration Reports for each Quarterly Report/CPF Update
Focal Plane Cal. Image	4-12	4-12/1Gs	B-B Registration Assessment Band Placement Calibration	Calibration Reports for each Quarterly Report/CPF Update
Night Scenes	(3) 20-44	20-44/1R	Characterize Coherent Noise Char. Scan Correlated Shift Characterize Memory Effect	Assessment Report for each Quarterly Report
PASC Data	(4) 180	180/1Rp	Characterize Memory Effect Rel. Radiometric Accuracy	Calibration Report for each Quarterly Report/CPF update
FASC Data	(5) 8-30	8-30/1Rf	Characterize Coherent Noise Char. Scan Correlated Shift Characterize Memory Effect Rel. Radiometric Accuracy	Calibration Report for each Quarterly Report/CPF update
MTF Image			Characterize MTF	Assessment Report for each Quarterly Report/ CPF update
Ground Look Calibration	1	1/1Gt	Absolute Rad. Accuracy	Calibration Report

(1) For each of the 6-24 scenes, process PAN band once to 1G systematic using PCD ephemeris and once again using FDF definitive ephemeris for a range of 12-48.
(2) For each of the 2-6 scenes, process PAN band to 1G systematic and then to 1G terrain corrected.
(3) Optimally, a 20 scene interval is desired once per quarter. Additionally, the non-bright scenes acquired with the PASC images will be ordered 2 per week.
(4) PASC imaging is scheduled once per day, each PASC acquisition is approximately 6 scenes in length with the bright area of interest covering 2 scenes that will be ordered (90x2). Each scene will be processed to 1R level using a unique PASC processing algorithm.
(5) FASC imagaing is scheduled once every six weeks, therefore could be acquired once or twice in a quarter. There are two types of FASC imaging; one collecting 8 scenes when done in conjunction with PASC imaging and one collecting 15 images when done on a stand alone basis.

Scenarios

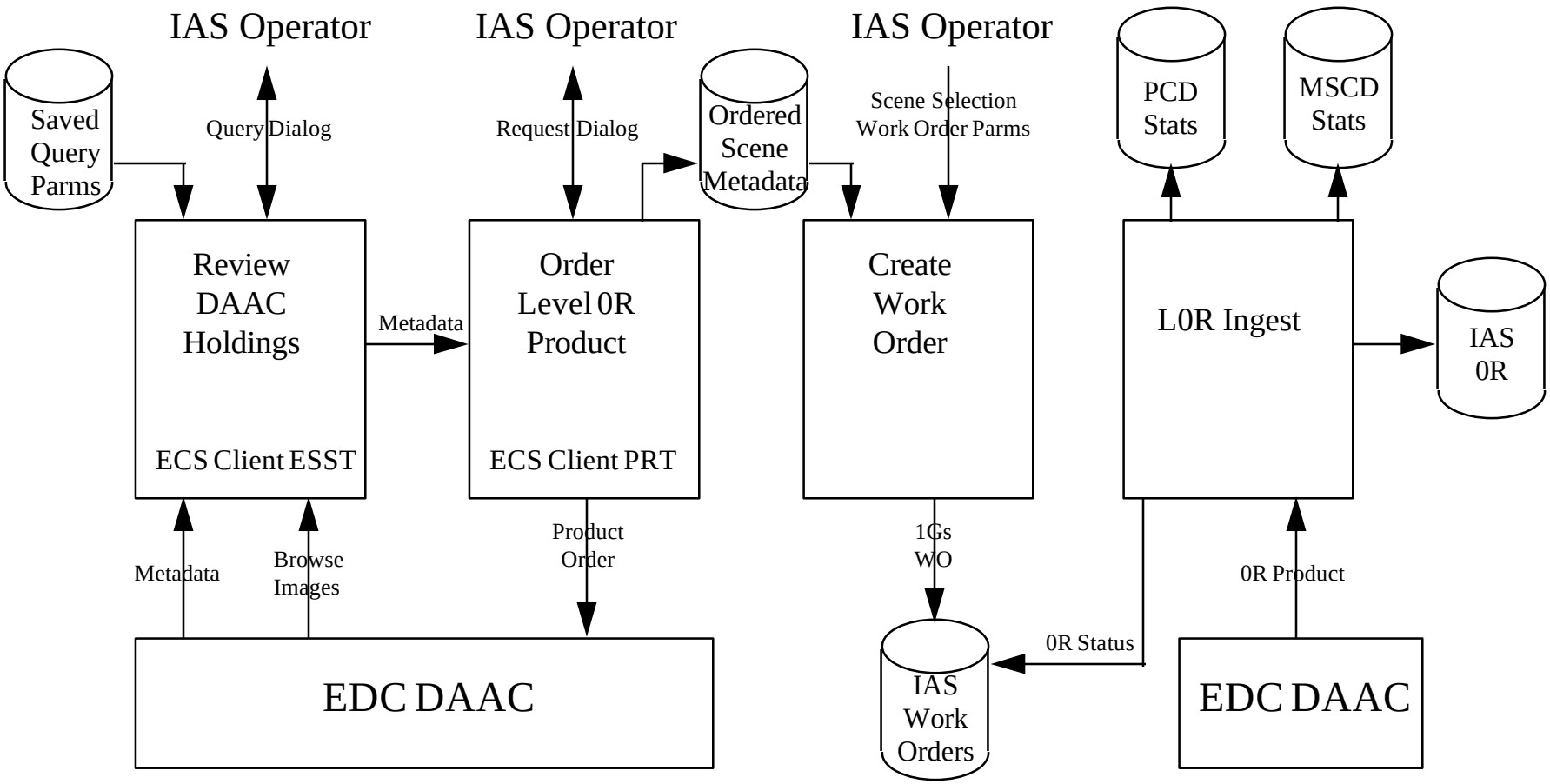
- Scenarios presented from a user's perspective
  - Order Data From DAAC
  - Generate MOC Request
  - Generate Work Order
  - Processing Scenario
  - Generate Calibration Parameter File

Order Data From DAAC

- Connect to DAAC via Web Browser
- Query/browse for desired scenes
- Select and order scenes
- Update IAS Work Order with corresponding scene ids
- DAAC notifies IAS when data is available and IAS ftps data
- Data products are checked for completeness
- IAS catalog updated with data product information
- Received data products checked against outstanding Work Orders and operator notified if no matches found

IAS Delta System/Preliminary Design Review

Order and Receive Data



Generate MOC Request

- Concentrated Ephemeris Request
  - User fills in a form specifying the start and end times for the requested data or selects a L0R product and the times are automatically extracted
  - Multiple requests may be put into a single request file
  - Request file is created and staged for transfer to the MOC
  - Requests are tracked in the database

Generate MOC Request (Cont'd)

- **Calibration Scene Request**
  - **User specifies if this is a orbit number based or WRS path/row based request**
  - **User fills in a form specifying the appropriate information**
  - **Multiple requests may be put into a single request file**
  - **Request file is created and staged for transfer to the MOC**
  - **Requests are tracked in the database**

Create Work Order

- New Work Order
  - User specifies a new Work Order and a form is displayed for the user to enter information
  - List of values and default values are supplied where appropriate
  - Input data is specified, if known
  - User selects processing procedure to apply to the input data
  - Processing parameters associated with the processing procedure are selected
  - Work Order is committed to the system
  - Process Control Subsystem will schedule the Work Order for processing once all required input data are available

Create Work Order (Cont'd)

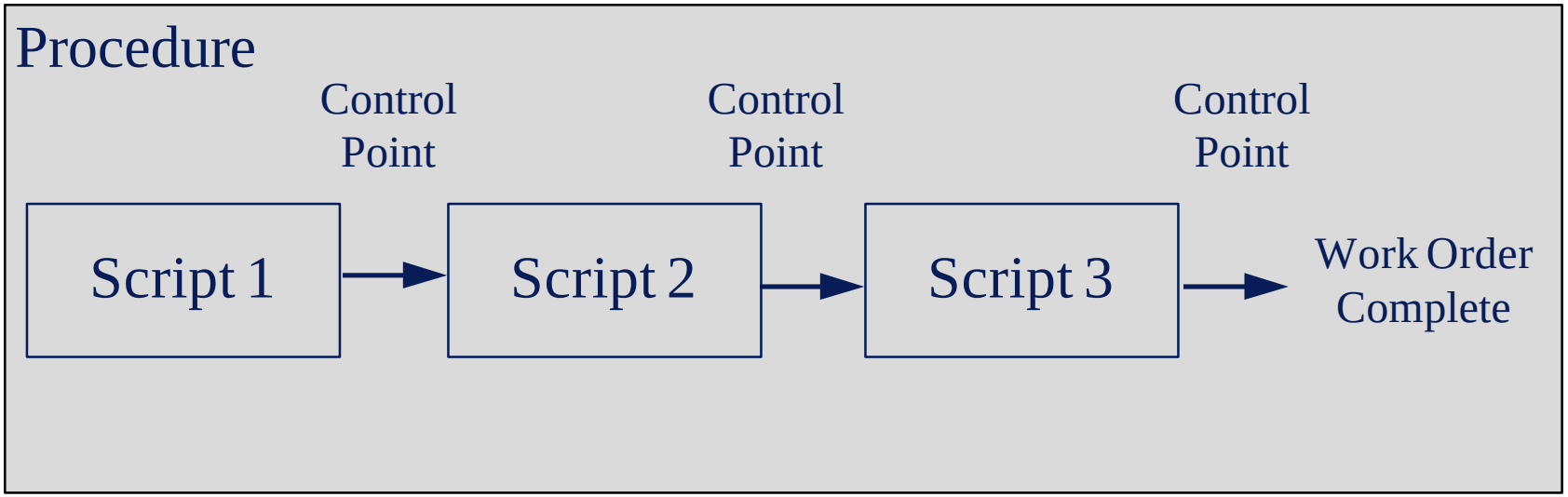
- **Modify Existing Work Order**
  - **User queries system for existing Work Order**
  - **Work Order attributes are displayed and the user may make and commit changes**

Create Work Order (Cont'd)

- Fields associated with Work Order setup
  - work order number (generated by system)
  - date entered (generated by system)
  - requester (generated by system)
  - priority
  - request type
  - requested completion date
  - processing procedure (submenu for input parameter selection)
  - input data specification
  - comment

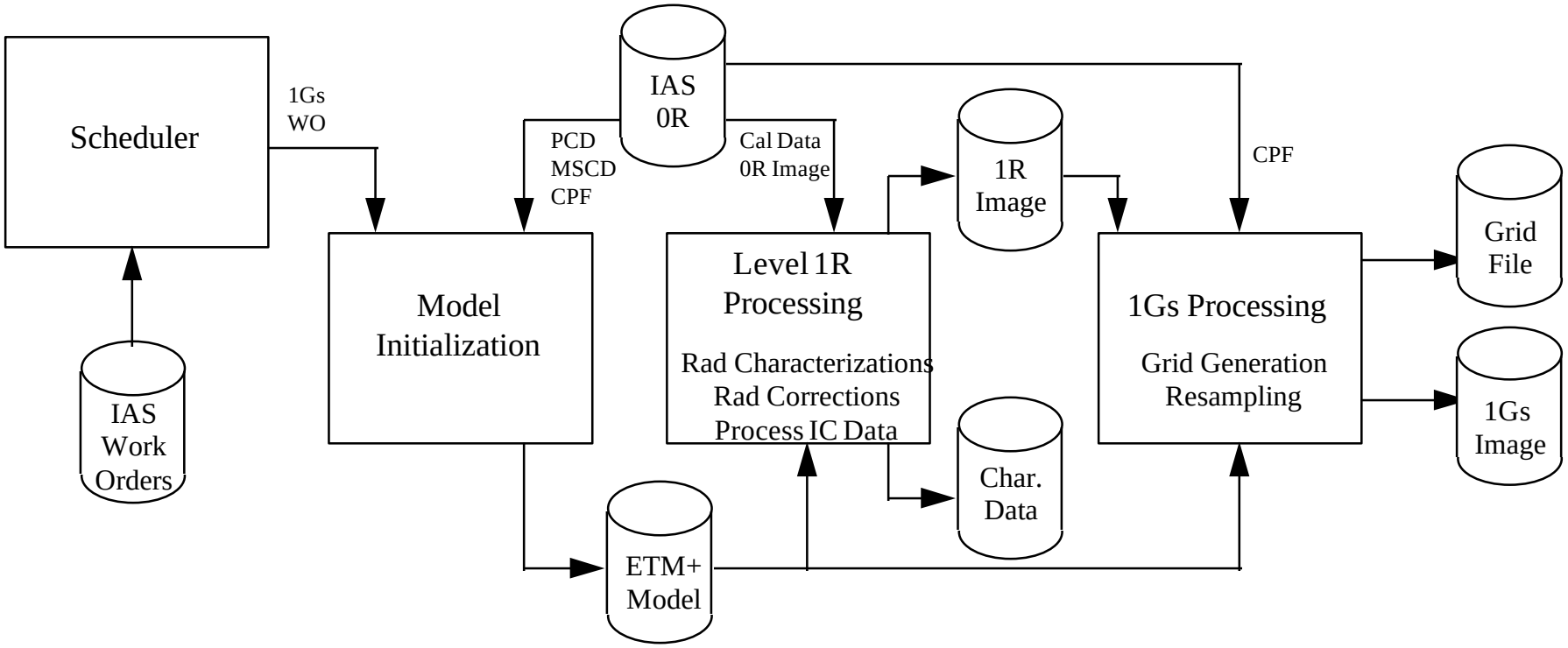
Work Order Processing Procedure

- Named procedures consist of a set of processing scripts
- Scripts execute application programs to process data
- Application programs obtain input parameters as needed
- Process Control System controls the execution of the scripts
- Scripts can be set to pause when complete for analysis of results



IAS Delta System/Preliminary Design Review

Standard 1R/1G Processing



Analysis of Results

- Execution of a processing procedure results in trending and calibration information
- Results may be reviewed at the end of each script or at the completion of the Work Order
- Processing history logs and intermediate products are generated in a Work Order specific directory
- E&A functions are used to view and analyze intermediate products and end results
- Cleanup of temporary files will begin once analyst has indicated that their review of the results is complete

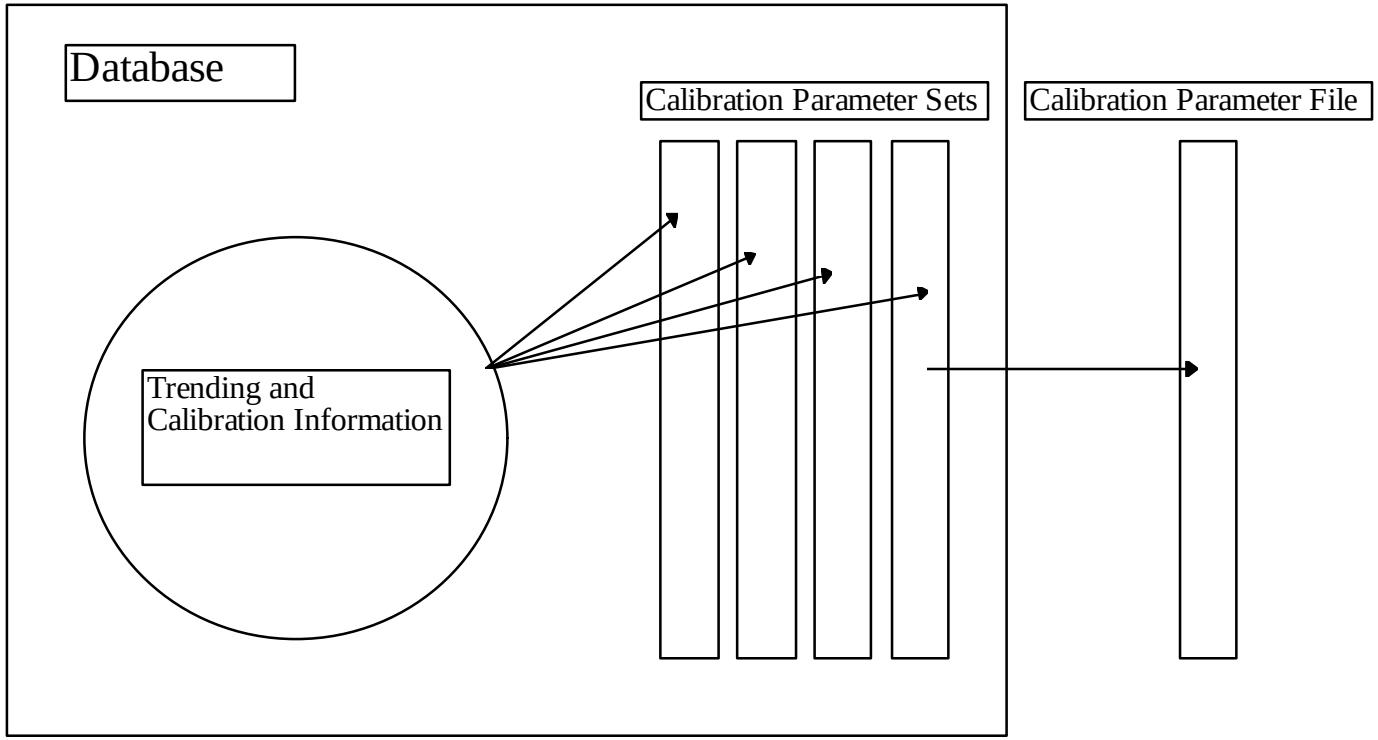
Anomaly Resolution

- The same tools used in normal processing are available for anomaly resolution and “what if” processing.
- Analyst sets up Work Order using standard or custom scripts
- Analyst can control execution of scripts (e.g., go backwards in procedure to rerun scripts)
- Results are “tagged” to differentiate them from normal processing runs

Generate Calibration Parameter File

- Calibration parameter sets are generated and maintained in the database
- To generate a new CPF the user selects the calibration parameter set to use from the database
- The appropriate filename is constructed and the parameters written to the CPF
- The database is updated to indicate that a CPF has been generated using the specified calibration parameter set
- The new CPF is reviewed before being released for distribution

Generate Calibration Parameter File (Cont'd)



Development and Testing

- Development and testing new algorithms occurs in the Dev/I&T environment
- Configuration management procedures control the promotion of applications from the Dev/I&T environment to the production system
- Further qualification may be performed in the E&A system